



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

July 26, 2024

David P. Rhoades
Senior Vice President
Constellation Energy Generation, LLC
President and Chief Nuclear Officer
Constellation Nuclear
4300 Winfield Road
Warrenville, IL 60555

SUBJECT: BRAIDWOOD STATION, UNITS 1 AND 2 – ENVIRONMENTAL ASSESSMENT
AND FINDING OF NO SIGNIFICANT IMPACT RELATED TO A REQUESTED
INCREASE IN ULTIMATE HEAT SINK TEMPERATURE
(EPID L-2024-LLA-0075)

Dear David Rhoades:

Enclosed is a copy of the Environmental Assessment and Finding of No Significant Impact related to your application for amendment dated June 4, 2024. The proposed amendment would raise the maximum ultimate heat sink temperature from 102 degrees Fahrenheit (°F) to 102.8 °F until September 30, 2024.

The assessment is being forwarded to the Office of the Federal Register for publication. If you have any questions, contact me at Joel.Wiebe@nrc.gov or 301-415-6606.

Sincerely,

/RA/

Joel S. Wiebe, Senior Project Manager
Plant Licensing Branch III
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket Nos. 50-456 and 50-457

Enclosure:
Environmental Assessment

cc: Listserv

ENCLOSURE

FEDERAL REGISTER NOTICE

NUCLEAR REGULATORY COMMISSION

[Docket Nos. 50-456 and 50-457; NRC-2024-0112]

Constellation Energy Generation, LLC;

Braidwood Station, Units 1 and 2;

Environmental Assessment and Finding of No Significant Impact

AGENCY: Nuclear Regulatory Commission.

ACTION: Notice; issuance.

SUMMARY: The U.S. Nuclear Regulatory Commission (NRC) is considering amending Renewed Facility Operating License Nos. NPF-72 and NPF-77, which authorize Constellation Energy Generation, LLC, (Constellation, the licensee) to operate Braidwood Station (Braidwood), Units 1 and 2. The proposed amendments would change Technical Specification (TS) Surveillance Requirement (SR) 3.7.9.2 to allow an ultimate heat sink (UHS) temperature of less than or equal to 102.8 degrees Fahrenheit (°F) through September 30, 2024. The NRC staff is issuing an environmental assessment (EA) and finding of no significant impact (FONSI) associated with the proposed amendments.

DATES: The EA and FONSI referenced in this document are available on **[INSERT DATE OF PUBLICATION IN THE *FEDERAL REGISTER*]**.

ADDRESSES: Please refer to Docket ID **NRC-2024-0112** when contacting the NRC about the availability of information regarding this document. You may obtain publicly available information related to this document using any of the following methods:

- **Federal Rulemaking Website:** Go to <https://www.regulations.gov> and search for Docket ID **NRC-2024-0112**. Address questions about Docket IDs in Regulations.gov to Stacy Schumann; telephone: 301-415-0624; email:

Stacy.Schumann@nrc.gov. For technical questions, contact the individual listed in the “For Further Information Contact” section of this document.

- **NRC’s Agencywide Documents Access and Management System**

(ADAMS): You may obtain publicly available documents online in the ADAMS Public Documents collection at <https://www.nrc.gov/reading-rm/adams.html>. To begin the search, select “Begin Web-based ADAMS Search.” For problems with ADAMS, please contact the NRC’s Public Document Room (PDR) reference staff at 1-800-397-4209, at 301-415-4737, or by email to PDR.Resource@nrc.gov. For the convenience of the reader, instructions about obtaining materials referenced in this document are provided in the “Availability of Documents” section.

- **NRC’s PDR:** The PDR, where you may examine and order copies of publicly available documents, is open by appointment. To make an appointment to visit the PDR, please send an email to PDR.Resource@nrc.gov or call 1-800-397-4209 or 301-415-4737, between 8 a.m. and 4 p.m. eastern time (ET), Monday through Friday, except Federal holidays.

FOR FURTHER INFORMATION CONTACT: Joel S. Wiebe, Office of Nuclear Reactor Regulation, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, telephone: 301-415-6606; email: Joel.Wiebe@nrc.gov.

SUPPLEMENTARY INFORMATION:

I. Introduction

The NRC is considering amending Renewed Facility Operating License Nos. NPF-72 and NPF-77, which authorize Constellation to operate Braidwood, Units 1 and 2, located in Will County, Illinois. Constellation submitted its license amendment request in accordance with section 50.90 of title 10 of the *Code of Federal Regulation* (10 CFR), “Application for amendment of license, construction permit, or early site permit,” by letter

dated June 4, 2024. If approved, the license amendments would revise TS SR 3.7.9.2 to allow a temporary increase in the allowable UHS average temperature of less than or equal to (\leq) 102.8°F (39.3 degrees Celsius ($^{\circ}$ C)) through September 30, 2024. In accordance with 10 CFR 51.21, the NRC has determined that an EA is the appropriate form of environmental review for the requested action. Based on the results of the EA that follows, the NRC has determined not to prepare an environmental impact statement for the proposed amendments and is issuing a FONSI.

II. Environmental Assessment

Description of the Proposed Action

The proposed action would allow Constellation to operate Braidwood, Units 1 and 2, at UHS temperatures up to 102.8°F (39.3°C) until September 30, 2024. The proposed action is in response to the licensee's license amendment request application dated June 4, 2024. The proposed action would amend the Braidwood, Units 1 and 2, renewed operating licenses TS to allow a temporary increase in the allowable average temperature of water withdrawn from the UHS and supplied to the plant for cooling from $\leq 102^{\circ}$ F (38.9°C) to $\leq 102.8^{\circ}$ F (39.3°C) through September 30, 2024. Specifically, the proposed action would revise TS SR 3.7.9.2, which currently states, "Verify average water temperature of UHS is $\leq 102.8^{\circ}$ F until September 30, 2023. After September 30, 2023, verify average water temperature of UHS is $\leq 102^{\circ}$ F" to state "Verify average water temperature of UHS is $\leq 102.8^{\circ}$ F until September 30, 2024. After September 30, 2024, verify average water temperature of UHS is $\leq 102^{\circ}$ F." Under the current TS, if the average UHS temperature as measured at the discharge of the operating essential service water system pumps is greater than 102°F (38.9°C), TS 3.7.9, Required Actions A.1 and A.2, would be entered concurrently and would require the licensee to place Braidwood in hot standby (Mode 3) within 12 hours and cold

shutdown (Mode 5) within 36 hours. The proposed action would allow Braidwood to continue to operate during times when the UHS indicated average water temperature exceeds 102°F (38.9°C) but is less than or equal to 102.8°F (39.3°C) through September 30, 2024. The current TS's UHS average water temperature limit of 102°F (38.9°C) would remain applicable to all other time periods beyond September 30, 2024. The proposed action is nearly identical to previously approved license amendments that allowed for the average water temperature of the UHS to be ≤ 102.8°F until September 30, 2020, September 30, 2021, September 30, 2022, and September 30, 2023. The NRC issued EAs for the 2020, 2021, 2022, and 2023, UHS amendments in the *Federal Register* on September 10, 2020 (85 FR 55863), July 7, 2021 (86 FR 35831), July 20, 2022 (87 FR 43301), and June 16, 2023 (88 FR 39487), respectively. The NRC issued the license amendments on September 24, 2020, July 13, 2021, August 10, 2022, and July 13, 2023, respectively. The only difference between the previously approved amendments to TS SR 3.7.9.2 and the proposed action is that the proposed action would replace the year "2023" with "2024." It should also be noted that during the past 4 years the temperature of the UHS has not exceeded 102°F, so no cumulative effects need be considered.

Need for the Proposed Action

The proposed action would allow Constellation to operate Braidwood, Units 1 and 2, during the hot summer months by allowing an UHS temperature of ≤ 102.8°F (39.3°C) until September 30, 2024. The licensee has requested the proposed amendments in connection with historical meteorological and atmospheric conditions that have resulted in the TS UHS temperature being challenged. These conditions included elevated air temperatures, high humidity, and low wind speed. Specifically, from July 4, 2020, through July 9, 2020, northern Illinois experienced high air temperatures

and drought conditions, which caused sustained elevated UHS temperatures. In response to these conditions in 2020, the licensee submitted license amendment requests contained in letter dated July 15, 2020, as supplemented by letter dated August 14, 2020. The NRC subsequently granted the licensee's request by letter dated September 24, 2020. The NRC approved similar requests for subsequent years by letters dated July 13, 2021, August 10, 2022, and July 13, 2023. Constellation projects that similar conditions are likely this year. The proposed action would provide the licensee with operational flexibility until September 30, 2024, so that the plant shutdown criteria specified in the TS are not triggered unless UHS temperature exceeds 102.8°F (39.3°C).

Plant Site and Environs

Braidwood Station, in Will County, Illinois, is located approximately 50 miles (mi) or 80 kilometers (km) southwest of the Chicago Metropolitan Area and 20 mi (32 km) south-southwest of Joliet. The Kankakee River is approximately five mi (8 km) east of the eastern site boundary. An onsite 2,540-acre (ac); 1,030-hectare (ha) cooling pond provides condenser cooling. Cooling water is withdrawn from the pond through the lake screen house, which is located at the north end of the pond. Heated water returns to the cooling pond through a discharge canal west of the lake screen house intake that is separated from the intake by a dike. The pond typically holds 22,300 acre-feet (27.5 million cubic meters) of water at any given time. The cooling pond includes both "essential" and "non-essential" areas. The essential cooling pond is the portion of the cooling pond that serves as the UHS for emergency core cooling, and it consists of a 99 ac (40-ha) excavated area of the pond directly in front of the lake screen house. The essential cooling pond's principal functions are to dissipate residual heat after reactor shutdown and to dissipate heat after an accident. It is capable of supplying Braidwood's

cooling system with water for 30 days without additional makeup water. The term “UHS” in this EA refers to the 99-ac (40-ha) essential cooling pond, and the term “cooling pond” or “pond” describes the entire 2,540-ac (1,030-ha) area, which includes both the essential and non-essential areas.

The cooling pond is also part of the Mazonia-Braidwood State Fish and Wildlife Area, which encompasses the majority of the non-UHS area of the cooling pond as well as Illinois Department of Natural Resources (IDNR) owned lands adjacent to the Braidwood site to the south and southwest of the cooling pond. Constellation and the IDNR have jointly managed the cooling pond as part of the Mazonia-Braidwood State Fish and Wildlife Area since 1991 pursuant to a long-term lease agreement. Under the terms of the agreement, the public has access to the pond for fishing, waterfowl hunting, fossil collecting, and other recreational activities.

The cooling pond is also a wastewater treatment works as defined by section 301.415 of title 35 of the Illinois Administrative Code (35 IAC 301.415). Under this definition, the cooling pond is not considered waters of the State under Illinois Administrative Code (35 IAC 301.440) or waters of the United States under the Federal Clean Water Act (40 CFR 230.3(s)), and so the cooling pond is not subject to State water quality standards. In addition, the cooling pond is a managed ecosystem where IDNR fish stocking and other human activities primarily influence species composition and population dynamics.

Since the beginning of the lease agreement, the IDNR has stocked the cooling pond with a variety of game fish, including largemouth bass (*Micropterus salmoides*), smallmouth bass (*M. dolomieu*), blue catfish (*Ictalurus furcatus*), striped bass (*Morone saxatilis*), crappie (*Pomoxis* spp.), walleye (*Sander vitreum*), and tiger muskellunge (*Esox masquinongy x lucius*). IDNR performs annual surveys to determine which fish to

stock based on fishermen preferences, fish abundance, different species' tolerance to warm waters, predator and prey dynamics, and other factors. Because of the warm water temperatures experienced in the summer months, introductions of warm water species, such as largemouth bass and blue catfish, have been more successful than introductions of cool-water species, such as walleye and tiger muskellunge. Since annual surveys began in 1980, IDNR has collected 47 species in the cooling pond. In recent years, bluegill (*Lepomis macrochirus*), channel catfish (*Ictalurus punctatus*), threadfin shad (*Dorosoma petenense*), and common carp (*Cyprinus carpio*) have been among the most abundant species in the cooling pond. Gizzard shad (*Dorosoma cepedianum*), one of the most frequently affected species during periods of elevated pond temperatures, have decreased in abundance dramatically in recent years, while bluegills, which can tolerate high temperatures with relatively high survival rates, have noticeably increased in relative abundance. IDNR stocked warm water game species, such as largemouth bass and blue catfish, continue to persist in small numbers, while cooler water stocked species, such as walleye and tiger muskellunge, no longer appear in IDNR survey collections. No Federally listed species or designated critical habitats protected under the Endangered Species Act (ESA) occur within or near the cooling pond.

The Kankakee River serves as the source of makeup water for the cooling pond. The river also receives continuous blowdown from the cooling pond. Water is withdrawn from a small river screen house located on the Kankakee River, and liquid effluents from Braidwood are discharged into the cooling pond blowdown line, which subsequently discharges into the Kankakee River.

The plant site and environs are described in greater detail in Chapter 3 of the NRC's November 2015 "Generic Environmental Impact Statement for License Renewal

of Nuclear Plants: Regarding Braidwood Station, Units 1 and 2, Final Report” (NUREG 1437, Supplement 55) or “Braidwood FSEIS” (Final Supplemental Environment Impact Statement). Figure 3-5 on pages 3-7 in the Braidwood FSEIS depicts the Braidwood Station layout, and Figure 3-4 on pages 3-6 depicts the cooling pond, including the portion of the pond that constitutes the essential cooling pond (or UHS) and the blowdown line to the Kankakee River.

Environmental Impacts of the Proposed Action

The proposed action consists of changing the year “2023” to “2024” in TS SR 3.7.9.2, allowing a temporary increase in the allowable UHS average temperature of $\leq 102.8^{\circ}\text{F}$ (39.3°C) until September 30, 2024.

The proposed changes would not increase the probability or consequences of radiological accidents. There would be no change to the types or amounts of radioactive effluents released into the environment and, therefore, no change in occupational or public radiation exposure from the proposed changes. Therefore, there would be no significant radiological environmental impacts associated with the proposed action.

In addition, the proposed action would have no direct impacts on land use or terrestrial biota, as the proposed action involves no new construction or modification of plant operational systems. There would be no changes to the quality or quantity of nonradiological effluents and no changes to the plant’s National Pollutant Discharge Elimination System permits would be needed. Overall staffing levels would not increase; therefore, worker vehicle air emissions are not expected to increase. In addition, there would be no noticeable effect on socioeconomic conditions in the region, no environment justice impacts, and no impacts to historic and cultural resources from the proposed action.

Temporarily raising the maximum allowable UHS temperature could increase cooling pond water temperatures until September 30, 2024. Because the proposed action would not affect Braidwood's licensed thermal power level, the temperature rise across the condensers as cooling water travels through the cooling system would remain unchanged. Thus, if water in the UHS were to rise to 102.8°F (39.3°C), heated water returning to the cooling pond through the discharge canal, which lies west of the river screen house, could also experience a corresponding increase. The additional heat load is expected to dissipate across some thermal gradient as discharged water travels down the discharge canal and through the 99-ac (40-ha) UHS.

Fish kills often occur when cooling pond temperatures rise above 95°F (35°C), the temperature at which most fish in the cooling pond are thermally stressed. For example, section 3.7.4 of the Braidwood FSEIS describes six fish kill events for the period of 2001 through 2015. The fish kill events, which occurred in July 2001, August 2001, June 2005, August 2007, June 2009, and July 2012, primarily affected threadfin shad and gizzard shad, although bass, catfish, carp, and other game fish were also affected. Reported peak temperatures in the cooling pond during these events ranged from 98.4°F (36.9°C) to over 100°F (37.8°C), and each event resulted in the death of between 700 to as many as 10,000 fish. During the July 2012 event, cooling pond temperatures exceeded 100°F (37.8°C), which resulted in the death of approximately 3,000 gizzard shad and 100 bass, catfish, and carp. This event coincided with the NRC's granting of Enforcement Discretion to allow Braidwood to continue to operate above the TS limit of $\leq 100^{\circ}\text{F}$ (37.8°C). The IDNR attributed this event, as well as four of the other fish kill events, to Braidwood operation and high cooling pond temperatures. Appendix B, section 4.1, of the Braidwood renewed facility operating licenses, requires Constellation to report unusual or important environmental events,

including fish kills, related to plant operation to the NRC. Since November 2015 (issuance of the Braidwood FSEIS), Constellation has not reported any additional fish kill events to the NRC. Although not related to plant operation, several fish kills have occurred since this time, the most recent of which happened in August 2018 and July 2020.

In section 4.7.1.3 of the Braidwood FSEIS, NRC staff concluded that thermal impacts associated with continued operation of Braidwood during the license renewal term would result in SMALL to MODERATE impacts to aquatic resources in the cooling pond. MODERATE impacts would primarily be experienced by gizzard shad and other non-stocked and low-heat tolerant species. As part of its conclusion, NRC staff also noted that because the cooling pond is a highly managed system, any cascading effects that result from the loss of gizzard shad (such as reduction in prey for stocked species, which in turn could affect those stocked species' populations) could be mitigated through IDNR's annual stocking and continual management of the pond. At that time, the UHS TS limit was $\leq 100^{\circ}\text{F}$ (37.8°C).

In 2016, the NRC granted license amendments that increased the allowable UHS average water temperature TS limit from $\leq 100^{\circ}\text{F}$ (37.8°C) to $\leq 102.0^{\circ}\text{F}$ (38.9°C). The NRC staff concluded in its environmental review that increasing the TS limit to $\leq 102.0^{\circ}\text{F}$ (38.9°C) would have no significant environmental effect, and the NRC issued a FONSI with the EA.

In 2020, 2021, 2022, and 2023 the NRC granted additional license amendments that temporarily increased the allowable UHS average water temperature TS limit from $\leq 102.0^{\circ}\text{F}$ (38.9°C) to $\leq 102.8^{\circ}\text{F}$ (39.3°C) until September 30, 2020, September 30, 2021, September 30, 2022, and September 30, 2023, respectively. The NRC staff concluded in

their reviews that temporarily increasing the TS limit to $\leq 102.8^{\circ}\text{F}$ (39.3°C) would have no significant environmental effect, and the NRC issued FONSI with the EAs.

The NRC staff has also determined that this proposed action would result in no significant impact to aquatic resources in the cooling pond for the same reasons reached in the 2020, 2021, 2022, and 2023, license amendments. The NRC staff's justification for this conclusion is as follows.

The proposed increase in the allowable UHS average water temperature limit by 0.8°F (0.4°C) would not increase the likelihood of a fish kill event because the current TS limit for the UHS of 102.0°F (38.9°C) already allows cooling pond temperatures above those at which fish species can be thermally stressed (95°F (35°C)). In effect, if the UHS temperature rises to the current TS limit, fish within or near the discharge canal, within the flow path between the discharge canal and UHS, or within the UHS itself would have already experienced thermal stress and possibly died. Thus, an incremental increase in the allowable UHS water temperature by 0.8°F (0.4°C) and the corresponding temperature increases within and near the discharge canal and within the flow path between the discharge canal and UHS would not significantly affect the number of fish kill events in the cooling pond. Additionally, the proposed action would only increase the allowable UHS average water temperature until September 30, 2024. Thus, any impacts to the aquatic communities in the managed cooling pond, if experienced, would be temporary in nature, and fish populations could recover quickly.

While the proposed action would not affect the likelihood of a fish kill event occurring during periods when the average UHS water temperature approaches the TS limit, the proposed action could increase the number of fish killed per high temperature event. For fish with thermal tolerances at or near 95°F (35°C), there would likely be no significant difference in the number of affected fish per high temperature event because,

as previously discussed, these fish could have already experienced thermal stress and possibly died, and the additional temperature increase would not measurably affect the mortality rate. For fish with thermal tolerances above 95°F (35°C), such as bluegill, increased mortality is possible, as previously explained.

In addition, scientific literature provides conflicting information as to whether incremental temperature increases would cause a subsequent increase in mortality rates of bluegill or other high-temperature-tolerant fish when temperatures exceed 100°F (37.8°C). For instance, in laboratory studies, Banner and Van Arman (1973) demonstrated 85 percent survival of juvenile bluegill after 24 hours of exposure to 98.6°F (37.0°C) water for stock acclimated to 91.2°F (32.9°C). At 100.0°F (37.8°C), survival decreased to 25 percent, and at 100.4°F (38.0°C) and 102.0°F (38.9°C), no individuals survived. Even at 1 hour of exposure to 102.0°F (38.9°C) water, average survival was relatively low between 40 to 67.5 percent per replicate. However, in another laboratory study, Cairns (1956 in Banner and Van Arman 1973) demonstrated that if juvenile bluegill were acclimated to higher temperatures at a 3.6°F (2.0°C) increase per day, individuals could tolerate water temperatures up to 102.6°F (39.2°C) with 80 percent survival after 24 hours of exposure.

Although these studies present inconsistent information on thermal tolerance limits, data from past fish kill events indicate that Cairns' study results more closely describe the cooling pond's bluegill population because the licensee has not reported bluegill as one of the species having been affected by past high temperature events. Thus, bluegills are likely acclimating to temperature rises at rates that allow individuals to remain in high temperature areas until temperatures decrease or allow individuals time to seek refuge in cooler areas of the pond. Alternately, if Banner and Van Arman's results were more predictive, 75 percent or more of bluegill individuals in high

temperature areas of the cooling pond could be expected to die at temperatures approaching or exceeding 100°F (37.8°C) for 24 hours, and shorter exposure time would likely result in the death of some reduced percentage of bluegill individuals.

Under the proposed action, fish exposure to temperatures approaching the proposed UHS TS average water temperature limit of 102.8°F (39.3°C) and those exposed to the associated discharge for at least 1 hour could result in observable deaths. However, as stated previously, the licensee has not reported bluegill as one of the species that has been affected during past fish kills. Consequently, the NRC staff assumes that bluegill and other high-temperature-tolerant species in the cooling pond would experience effects similar to those observed in Cairn's study. Based on Cairn's results, the proposed action's incremental and short-term temperature increase could result in the death of some additional high-temperature-tolerant individuals, especially in cases where cooling pond temperatures rise dramatically over a short period of time (more than 3.6°F (2.0°C) in a 24-hour period).

Nonetheless, the discharge canal, flow path between the discharge canal and the UHS, and the UHS itself is a small portion of the cooling pond. Thus, while the incremental increase would likely increase the area over which cooling pond temperatures would rise, most of the cooling pond would remain at tolerable temperatures, and fish would be able to seek refuge in those cooler areas. Therefore, only fish within or near the discharge canal, within the flow path between the discharge canal and UHS, or within the UHS itself at the time of elevated temperatures would likely be affected, and fish would experience such effects to lessening degrees over the thermal gradient that extends from the discharge canal. This would not result in a significant difference in the number of fish killed per high temperature events for those species with thermal tolerances at or near 95°F (35°C) and an insignificant increase in

the number of individuals affected for species with thermal tolerances above 95°F (35°C), such as bluegill. Additionally, the cooling pond is a managed ecosystem in which fish stocking, fishing pressure, and predator-prey relationships constitute the primary population pressures.

Fish populations affected by fish kills generally recover quickly and, thus, fish kills do not appear to significantly influence the fish community structure. This is demonstrated by the fact that the species that are most often affected by high temperature events (threadfin shad and gizzard shad) are also among the most abundant species in the cooling pond. Managed species would continue to be assessed and stocked by the IDNR on an annual basis in accordance with the lease agreement between Constellation and IDNR. Continued stocking would mitigate any minor effects resulting from the proposed action. As previously stated in this notice, although authorized to operate up to 102.8°F (39.3°C), at no time in the past 3 years did the UHS temperature exceed 102°F (38.9°C).

Based on the foregoing analysis, the NRC staff concludes that the proposed action would not result in significant impacts to aquatic resources in the cooling pond. Some terrestrial species, such as birds or other wildlife, rely on fish or other aquatic resources from the cooling pond as a source of food. The NRC staff does not expect any significant impacts to birds or other wildlife because, if a fish kill occurs, the number of dead fish would be a small proportion of the total population of fish in the cooling pond. Furthermore, during fish kills, birds and other wildlife could consume many of the floating, dead fish. Additionally, and as described previously, the NRC staff does not expect that the proposed action would result in a significant difference in the number or intensity of fish kill events or otherwise result in significant impacts on aquatic resources in the cooling pond.

With respect to water resources and ecological resources along and within the Kankakee River, the Illinois Environmental Protection Agency imposes regulatory controls on Braidwood's thermal effluent through title 35, Environmental Protection, section 302, "Water Quality Standards," of the Illinois Administrative Code (35 IAC 302) and through the National Pollutant Discharge Elimination System (NPDES) permitting process pursuant to the Clean Water Act. Section 302 of the Illinois Administrative Code stipulates that "[t]he maximum temperature rise shall not exceed 2.8°C (5°F) above natural receiving water body temperatures," (35 IAC 302.211(d)) and that "[w]ater temperature at representative locations in the main river shall at no time exceed 33.7°C (93°F) from April through November and 17.7°C (63°F) in other months" (35 IAC 302.211(e)). Additional stipulations pertaining to the mixing zone further protect water resources and biota from thermal effluents. The Braidwood NPDES permit contains special conditions that mirror these temperature requirements and that stipulate more detailed temperature requirements at the edge of the mixing zone. Under the proposed action, Braidwood thermal effluent would continue to be limited by the Illinois Administrative Code and the Braidwood NPDES permit to ensure that Braidwood operations do not create adverse effects on water or ecological resources along or within the Kankakee River. Occasionally, the licensee has applied for a provisional variance to allow higher-than-permitted temperatures at the edge of the discharge mixing zone. For instance, Exelon, the license holder at the time, applied for and the Illinois Environmental Protection Agency (IEPA) granted one provisional variance in 2012 during a period of extremely warm weather and little to no precipitation. Constellation reported no fish kills or other events to the IEPA and the NRC that would indicate adverse environmental effects resulting from the provisional variance. The details of this provisional variance are described in section 4.7.1.3 of the Braidwood FSEIS.

Under the proposed action, Constellation would remain subject to the regulatory controls described in this notice. The NRC staff finds it reasonable to assume that Constellation's continued compliance with, and the State's continued enforcement of, the Illinois Administrative Code and the Braidwood NPDES permit would ensure that Kankakee River water and ecological resources are protected. Further, the proposed action would not alter the types or amounts of effluents being discharged to the river as blowdown. Therefore, the NRC staff does not expect any significant impacts to water or ecological resources within and along the Kankakee River from temporarily increasing the allowable UHS average water temperature TS limit.

With respect to Federally listed species, the NRC staff consulted with the U.S. Fish and Wildlife Service (FWS) pursuant to section 7 of the ESA during its license renewal environmental review for Braidwood. During that consultation, the NRC staff found that the sheepsnose (*Plethobasus cyphus*) and snuffbox (*Epioblasma triquetra*) mussels had the potential to occur in the areas that would be directly or indirectly affected by license renewal (i.e., the action area). In September 2015, Exelon transmitted the results of a mussel survey to the NRC and the FWS. The survey documented the absence of Federally listed mussels near the Braidwood discharge site in the Kankakee River. Based on this survey and other information described in the Braidwood FSEIS, the NRC concluded that license renewal may affect, but is not likely to adversely affect the sheepsnose mussel, and the NRC determined that license renewal would have no effect on the snuffbox mussel. The FWS concurred with the NRC's "not likely to adversely affect" determination in a letter dated October 20, 2015. The results of the consultation are further summarized in the Record of Decision for Braidwood license renewal.

As previously described, the impacts of the proposed action would be confined to the UHS cooling pond and would not affect water or ecological resources along and within the Kankakee River. The NRC's previous ESA, section 7, consultation confirmed that no Federally listed aquatic species occur within or near the cooling pond. The NRC has not identified any information indicating the presence of Federally listed species in the area since consultation was concluded, and the FWS has not listed any new aquatic species that may occur in the area since that time. The proposed action would not result in any disturbance or other impacts to terrestrial habitats and, thus, no Federally listed terrestrial species would be affected. Accordingly, the NRC staff concludes that the proposed action would have no effect on Federally listed species or designated critical habitat. Consultation with the FWS regarding the proposed action is not necessary because the NRC staff has determined that the proposed action will have no effect on listed species or critical habitat.

The NRC staff has identified no foreseeable land use, visual resource, noise, or waste management impacts given that the proposed action would not result in any physical changes to Braidwood facilities or equipment or changes any land uses on or off site. The NRC staff has identified no air quality impacts given that the proposed action would not result in air emissions beyond what would be experienced during current operations. Additionally, there would be no socioeconomic, environmental justice, or historic and cultural resource impacts associated with the proposed action since no physical changes would occur beyond the site boundaries and any impacts would be limited to the cooling pond.

Based on the discussion and findings previously described in this EA, the NRC concludes that the proposed action would not significantly affect plant safety and would not have a significant adverse effect on the probability of an accident occurring. In

addition, there would be no significant nonradiological environmental impacts associated with the proposed action. Accordingly, the NRC concludes that the proposed action would have no significant environmental effect on the quality of the human environment.

Environmental Impacts of the Alternatives to the Proposed Action

As an alternative to the proposed action, the NRC staff considered the denial of the proposed action (i.e., the “no-action” alternative). Denial of the proposed action would result in no changes to the current TS. Therefore, the licensee would continue to be required to place Braidwood in hot standby (Mode 3) if average UHS water temperatures exceed 102°F (38.9°C). The no-action alternative would result in no change in current environmental conditions or impacts at Braidwood beyond those considered in the Braidwood FSEIS.

Alternative Use of Resources

There are no unresolved conflicts concerning alternative uses of available resources under the proposed action.

Agencies and Persons Consulted

No additional agencies or persons were consulted regarding the environmental impact of the proposed action.

III. Finding of No Significant Impact

Constellation submitted a license amendment request in accordance with 10 CFR 50.90. The request seeks to amend Renewed Facility Operating License Nos. NPF-72 and NPF-77, issued to Constellation for operation of Braidwood. The amendments would revise TS SR in TS 3.7.9.2 to allow a temporary increase in the allowable UHS average temperature of less than or equal to (\leq) 102.8°F (39.3 degrees Celsius (°C)) through September 30, 2024. The NRC is considering the requested amendments.

In addition, the NRC staff conducted an environmental review of the proposed action, and prepared an EA, which is provided in Section II of this notice and is incorporated by reference in this FONSI. The NRC determined the proposed action would not significantly affect plant safety, would not have a significant adverse effect on the probability of an accident occurring, and would not have any significant radiological or nonradiological impacts. Based on the EA, the NRC staff has concluded that the proposed action will not have a significant impact on the quality of the human environment. Based on its finding, the NRC has decided not to prepare an environmental impact statement for the proposed action.

As required by 10 CFR 51.32(a)(5), the related environmental document is the “Generic Environmental Impact Statement for License Renewal of Nuclear Plants: Regarding Braidwood Station, Units 1 and 2, Final Report,” NUREG-1437, Supplement 55, which provides the latest environmental review of current operations and description of environmental conditions at Braidwood.

Section IV lists the environmental documents related to the proposed action and includes information on the availability of these documents.

This FONSI and other related environmental documents are available for public inspection and are accessible online in the ADAMS Public Documents collection at <https://www.nrc.gov/reading-rm/adams.html>. Persons who do not have access to ADAMS or who encounter problems in accessing the documents located in ADAMS should contact the NRC’s PDR reference staff by telephone at 1-800-397-4209 or 301-415-4737, or by email to PDR.Resource@nrc.gov.

IV. Availability of Documents

The documents identified in the following table are available to interested persons through one or more of the following methods, as indicated.

DOCUMENT DESCRIPTION	ADAMS ACCESSION NO.
Amendment Request	
Constellation Energy Generation, LLC. License Amendment to Braidwood Station, Units 1 and 2, Technical Specification 3.7.9, "Ultimate Heat Sink," dated June 4, 2024.	ML24156A245
Similar Amendments	
Braidwood Station, Units 1 and 2 - Issuance of Amendments Nos. 218 and 218 Re: Revision of Technical Specifications for the Ultimate Heat Sink (EPID L-2020-LLA-0159), dated September 24, 2020	ML20245E419
Braidwood Station, Units 1 and 2 - Issuance of Amendments Nos. 222 and 222 Re: Revision of Technical Specifications for the Ultimate Heat Sink (EPID L-2020-LLA-0095), dated July 13, 2021.	ML21154A046
Braidwood Station, Units 1 and 2 - Issuance of Amendments Nos. 228 and 228 Re: Revision of Technical Specifications for the Ultimate Heat Sink (EPID L-2022-LLA-0082), dated August 10, 2022.	ML22173A214
Braidwood Station, Units 1 and 2 - Issuance of Amendment Nos. 232 and 232 Re: Revision of Technical Specifications for the Ultimate Heat Sink (EPID L-2022-LLA-0042), dated July 13, 2023.	ML23087A076
Other Referenced Documents	
Cairns J. 1956. Effects of heat on fish. <i>Industrial Wastes</i> , 1:180-183.	n/a ⁽¹⁾
Banner A, Van Arman JA. 1973. Thermal effects on eggs, larvae and juveniles of bluegill sunfish. Washington, DC: U.S. Environmental Protection Agency. EPA-R3-73-041.	n/a ⁽¹⁾
Ecological Specialists, Inc. Final Report: Five Year Post-Construction Monitoring of the Unionid Community Near the Braidwood Station Kankakee River Discharge, dated September 29, 2015.	ML15274A093 (Package)
Exelon Generation Company, LLC. Byron and Braidwood Stations, Units 1 and 2, License Renewal Application, Braidwood Station Applicant's Environmental Report, Responses to Requests for Additional Information, Environmental RAs AQ-11 to AQ-15, dated April 30, 2014, as modified by letter dated October 8, 2014 (ML14281A019).	ML14339A044
U.S. Fish and Wildlife Service. Concurrence Letter Concluding Informal Consultation with the NRC for Braidwood License Renewal, dated October 20, 2015.	ML15299A013

Exelon Generation Company, LLC. License Amendment to Braidwood Station, Units 1 and 2, Technical Specification 3.7.9, "Ultimate Heat Sink," dated July 15, 2020.	ML20197A434
Exelon Generation Company, LLC Supplement to License Amendment to Braidwood Station, Unit 1 and 2, Technical Specification 3.7.9, "Ultimate Heat Sink," dated August 14, 2020.	ML20227A375
U.S. Nuclear Regulatory Commission. Generic Environmental Impact Statement for License Renewal of Nuclear Plants: Regarding Braidwood Station, Units 1 and 2, Final Report (NUREG-1437, Supplement 55), dated November 30, 2015.	ML15314A814
U.S. Nuclear Regulatory Commission. Constellation Energy Generation, LLC; Docket No. STN 50-456; Braidwood Station, Unit 1 Renewed Facility Operating License, issued on January 27, 2016, as amended through amendment number 234.	ML053040362
U.S. Nuclear Regulatory Commission. Constellation Energy Generation, LLC; Docket No. STN 50-457; Braidwood Station, Unit 2 Renewed Facility Operating License, issued on January 27, 2016, as amended through amendment number 234.	ML053040366
U.S. Nuclear Regulatory Commission. Record of Decision; U.S. Nuclear Regulatory Commission; Docket Nos. 50-456 and 560-457; License Renewal Application for Braidwood Station, Units 1 and 2, dated January 27, 2016.	ML15322A317
U.S. Nuclear Regulatory Commission. Environmental Assessment and Finding of No Significant Impact Related to Ultimate Heat Sink Modification, dated July 18, 2016.	ML16181A007
U.S. Nuclear Regulatory Commission. Braidwood Station, Units 1 and 2 – Issuance of Amendments Re: Ultimate Heat Sink Temperature Increase, dated July 26, 2016.	ML16133A438
U.S. Nuclear Regulatory Commission. Environmental Assessment and Finding of No Significant Impact Related to Temporary Revision of Technical Specifications for the Ultimate Heat Sink, dated September 3, 2020.	ML20231A469
U.S. Nuclear Regulatory Commission. Environmental Assessment and Finding of No Significant Impact Related to Temporary Revision of Technical Specifications for the Ultimate Heat Sink, dated June 30, 2021.	ML21165A041
U.S. Nuclear Regulatory Commission.	ML22159A176

<i>Federal Register</i> Notice, Environmental Assessment and Finding of No Significant Impact Related to Temporary Revision of Technical Specifications for the Ultimate Heat Sink, dated July 15, 2022.	
U.S. Nuclear Regulatory Commission. <i>Federal Register</i> Notice, Environmental Assessment and Finding of No Significant Impact Related to Temporary Revision of Technical Specifications for the Ultimate Heat Sink, dated June 12, 2023.	ML23110A122
⁽¹⁾ These references are subject to copyright laws and are, therefore, not reproduced in ADAMS.	

Dated: July 26, 2024.

For the Nuclear Regulatory Commission.

/RA/

Joel S. Wiebe, Senior Project Manager,
Licensing Projects Branch III,
Division of Operating Reactors,
Office of Nuclear Reactor Regulation.

SUBJECT: BRAIDWOOD STATION, UNITS 1 AND 2 – ENVIRONMENTAL ASSESSMENT AND FINDING OF NO SIGNIFICANT IMPACT RELATED TO A REQUESTED INCREASE IN ULTIMATE HEAT SINK TEMPERATURE (EPID L-2024-LLA-0075) DATED JULY 26, 2024

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ADAMS Accession Nos.:
Package ML24172A142
Letter ML24172A125
EA FRN ML24172A126

NRR-106

OFFICE	NRR/DORL/LPL3/PM	NRR/DORL/LPL3/LA	NMSS/REFS/ERLRB/BC (A)
NAME	JWiebe	SRohrer	TSmith (DPalmrose for)
DATE	6/28/2024	6/20/2024	6/28/2024
OFFICE	OGC - NLO	NRR/DORL/LPL3/BC	NRR/DORL/LPL3/PM
NAME	AGhoshNaber	JWhited	JWiebe
DATE	7/19/2024	7/22/2024	7/26/2024

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